

We claim:

1. In a system having an application and a plurality of boards, where the application is implemented by several software processes operating with the assistance of middleware between said boards and the application, and where said plurality of boards are adaptable to communicate pursuant to a standard that contemplates a controller dedicated therewith, a method for removing a subject board from the system while the application is running (a “hotswap”), comprising the steps of:

(a) connecting the boards with a communications channel in addition to that of the standard;

(b) alerting subject board of the intention to remove it;

(c) subject board reporting its alerted state to middleware;

(d) preventing new transactions on all appropriate boards in accordance with the application;

(e) informing the application through middleware;

(f) waiting for the application to respond to middleware;

(g) waiting for appropriate boards to report that they are quiescent;

(h) informing all parts of the system other than the subject board, that need to know, that the subject board is no longer present;

(i) returning control to the subject board to signal that extraction of the subject board can be safely performed.

2. The method of claim 1, wherein each said board is represented by a corresponding middleware object, and communications services among said board objects are implemented using CORBA, and steps c) to h) above, are implemented using CORBA.
- 5 3. The method of claim 2, wherein said steps c), g) and h) are effected by using said additional communications channel.
4. The method of claim 3, wherein the standard is one of {CompactPCI, PCI, VME}.
- 10 5. The method of claim 4, wherein said additional communications channel, operates on Ethernet protocol.
6. The method of claim 5, wherein said controller includes functionality for
- 15 hardware connection control in effecting a hotswap according to the standard.
7. The method of claim 6, wherein said controller is not present.
8. The method of claim 2, wherein the control of such method is effected physically
- 20 remotely from the chassis of the boards, using said additional communications channel.
9. The method of claim 1, where the boards which are adaptable to communicate pursuant to a standard, are configured not to so communicate.
- 25 10. In a system having an application and a plurality of boards, where the application is implemented by several software processes, and where said plurality of boards are adaptable to communicate pursuant to a standard that contemplates a controller dedicated therewith, a method for removing a subject board from the system while the application is running (a "hotswap"), comprising the steps of:
- 30 (a) connecting the boards with a communications channel in addition to that of the

standard;

(b) alerting subject board of the intention to remove it;

5 (c) subject board reporting its alerted state to middleware;

(d) preventing new transactions on all appropriate boards in accordance with the application;

10 (e) informing the application through middleware;

(f) waiting for the application to respond to middleware;

(g) waiting for appropriate boards to report that they are quiescent;

15

(h) informing all parts of the system other than the subject board, that need to know, that the subject board is no longer present;

(i) returning control to the subject board to signal that extraction of the subject board  
20 can be safely performed.

11. The method of claim 10, wherein said steps c), g) and h) are effected by using said additional communications channel.

25 12. The method of claim 11, wherein said additional communications channel, operates on Ethernet protocol.

13. The method of claim 12, wherein said controller includes functionality for hardware connection control in effecting a hotswap according to the standard.

30

14. The method of claim 13, wherein said controller is not present.

15. The method of claim 14, wherein the control of such method is effected physically remotely from the chassis of the boards, using said additional communications channel.

5

16. The method of claim 15, where the boards which are adaptable to communicate pursuant to a standard, are configured not to so communicate.

17. In a system having an application and a plurality of boards, where the application is implemented by several software processes operating with the assistance of middleware between said boards and the application, and where said plurality of boards are adaptable to communicate pursuant to a standard that contemplates a controller dedicated therewith, a method for removing a subject board from the system while the application is running (a "hotswap"), comprising the steps of:

- 15 a) connecting the boards with a communications channel in addition to that of the standard;
- b) preventing any new transactions on the subject board;
- c) notifying relevant other boards;
- d) waiting for appropriate responses from relevant other boards; and
- 20 e) waiting for subject board to quiesce;

where steps b) to e) are effected using said additional communications channel.

18. The method of claim 17, wherein each said board is represented by a corresponding middleware object, and communications services among said board objects are implemented using CORBA, and steps c) to h) above, are implemented using CORBA.

19. The method of claim 20, wherein the standard is one of {CompactPCI, PCI, VME}.

30